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# New Species of *Sapranthus* B. C. Seemann and *Unonopsis* R. E. Fries (Annonaceae) from Mesoamerica

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**ABSTRACT.** Two new species of Annonaceae, *Sapranthus viridiflorus* G. E. Schatz and *Unonopsis stevensii* G. E. Schatz, are described from Mesoamerica. Color photographs of the new species can be accessed over the World Wide Web by searching the name in W<sup>3</sup>TROPICOS at <http://www.mobot.org/Pick/Search/pick.html>.

**RESUMEN.** Se describen dos especies nuevas de Annonaceae, *Sapranthus viridiflorus* G. E. Schatz y *Unonopsis stevensii* G. E. Schatz, de Mesoamérica. Fotografías a color de las especies nuevas son accesibles buscando el nombre en las páginas de Internet de W<sup>3</sup>TROPICOS en la siguiente dirección: <http://www.mobot.org/Pick/Search/pick.html>.

In anticipation of the upcoming publication of the *Flora de Nicaragua*, I provide here names and descriptions for two undescribed species of Annonaceae from Mesoamerica. *Sapranthus viridiflorus* G. E. Schatz is the southernmost of seven species in a genus extending from the states of Sinaloa and Veracruz, Mexico, to the province of Los Santos, Panama. In contrast to the other species of *Sapranthus* B. C. Seemann, which occur in seasonally dry deciduous forest and possess membranaceous reddish to deep purple petals with evident venation, *S. viridiflorus* occurs in moist to wet evergreen forest and exhibits thick, fleshy green petals lacking venation at maturity.

*Unonopsis* R. E. Fries is a genus of ca. 40 species distributed from Belize to Bolivia in wet, evergreen forest, with 6 species currently known from Mesoamerica, and an additional 4–5 new species awaiting description. Although not yet known from Nicaragua, *Unonopsis stevensii* G. E. Schatz is to be expected in the southeastern region of the country along the Río San Juan just to the north of Cerro Coronel and Barra del Colorado in Costa Rica, the sole locality for the new species.

***Sapranthus viridiflorus*** G. E. Schatz, sp. nov.

**TYPE:** Costa Rica. Heredia: La Selva Biological Station of the Organization for Tropical Studies, 4 km S of Puerto Viejo de Sarapiquí, 10°26'N, 84°01'W, 35 m, 15 Feb. 1984 (fl), G. E. Schatz 963 (holotype, MO; isotypes, CR, WIS). Figures 1, 2, and [http://hoya.mobot.org/mobot/research/image/01602308\\_001.jpg](http://hoya.mobot.org/mobot/research/image/01602308_001.jpg), [http://hoya.mobot.org/mobot/research/image/01602308\\_002.jpg](http://hoya.mobot.org/mobot/research/image/01602308_002.jpg)

A speciebus aliis *Sapranthi* petalis enervibus carnis viridibus et carpellis 2–5 differt.

Tree to 12 m tall, the young branches brownish gray tomentose. Leaves membranaceous, the petiole 0.4–1.0 cm long, shallowly canaliculate, brownish gray tomentose; lamina elliptic to oblong-obovate, 5.6–29.8 cm long, 2.7–12.1 cm broad, the base cuneate to rounded and somewhat truncate, the apex acuminate to cuspidate, the upper lamina surface sparsely white velutinous, the lower surface white velutinous, the margins finely ciliate; venation weakly brochidodromous with 8–15 lateral veins per side, the midrib slightly impressed and densely white velutinous above, especially toward the base, prominently elevated and short white hirsute below, drying purplish black, the slender lateral veins elevated and short white hirsute below. Flowers solitary, pendent, terminal but appearing leaf-opposed (or rarely cauliflorous and borne on older wood), with a fruity fragrance, albeit with a slightly fetid component; pedicel 1.0–1.7 cm long, sparsely tomentellous, bearing a lanceolate-ovate to rounded bract near the base to 0.8 cm from the base, 0.5–0.9 cm long, 0.3–0.5 cm broad, the apex acute to obtuse, the base decurrent along the pedicel, the margins revolute. Sepals triangular, 0.7–0.8 cm long, 0.5–0.7 cm broad, the apex acute, slightly reflexed, the base truncate, tomentellous outside. Petals 6, in 2 subequal imbricate whorls, membranaceous and with venation evident in bud, becoming fleshy and lacking any evident venation at anthesis when fresh, revealing faint venation when



Figure 1. Flower of *Sapranthus viridiflorus* G. E. Schatz with one inner petal removed (G. E. Schatz 963; photo: G. E. Schatz).



Figure 2. Fruiting branch of *Sapranthus viridiflorus* G. E. Schatz (G. E. Schatz 1031; photo: G. E. Schatz).

dried, green with a purple blush at the base inside when fresh; outer petals lanceolate to ovate, 2.6–2.9 cm long, 1.2–1.5 cm broad, the apex acute, the base rounded, flat, thin, sparsely tomentellous initially outside, at length glabrescent; inner petals ovate, 2.4–2.8 cm long, 1.1–1.3 cm broad, the apex acute, the base cuneate, concave, the margins strongly revolute, glabrous both inside and outside, bearing a shallowly triangular white patch (vestigial food body) at the base inside, 2.5 mm long, 4.5 mm broad. Stamens ca. 60, 1.8–2.3 mm long, the filament 0.3 mm long, the thecae 1.4–1.9 mm long, the apical prolongation of the anther connective truncate discoid, 0.1 mm thick, minutely tuberculate, purple; pollen disulcate, with an equatorial ridge outlining the sulculi, the tectum very shallowly verrucate. Carpels 2–5, usually 4; stigma nappiform, 1.5 mm long, 2 mm broad, with a medial furrow, setaceous, yellowish white; ovaries prismatic, 2 mm long, setose; ovules 10–17, in two rows. Monocarps oblong, short-stipitate, to 10 cm long, 4.5 cm diam., the apex and base rounded, green at maturity, densely puberulous; stipe 0.3 cm long, attached obliquely to the monocarp; seeds lunate, 2.3 cm long, 1.5 cm broad, 0.7 cm thick, the seed coat smooth, light orange-brown.

**Distribution.** *Sapranthus viridiflorus* is known from moist to wet forest in southeastern Nicaragua and Costa Rica, and from a single collection from Los Santos, Panama. In Costa Rica, it ranges in elevation from sea level to 700 m in the Turrialba region, 1700 m in San José province in the Cerros de Escazú and 1110 m at Estación Cacao in the Tilarán range, as well as near sea level on the Pacific slope in the Carara Reserve in Puntarenas province. The collection from Los Santos province in Panama represents the only collection of the genus *Sapranthus* from Panama. At La Selva Biological Station, *S. viridiflorus* occurs on only the most recent alluvial soils.

*Sapranthus viridiflorus* differs from all other *Sapranthus* species by its fleshy, green petals that lack visible venation, and the low number of carpels (2–5, in contrast to 9–38 throughout the rest of the genus). It possibly represents the penetration of a widespread, Pacific dry forest genus into wetter forests, perhaps during drier glacial periods. In comparison to the dry forest species, *S. viridiflorus* exhibits probable paedomorphic adaptive responses to the lower light levels and high rainfall in wet forests. Character shifts that accompany the wet forest habitat include: (1) reduced overall flower size; (2) retention of green petals with only a slight purple blush at their base; (3) fleshy vs. membrana-

ceous petals with a subsequent loss of visible venation; (4) loss of the fleshy food body at the base of the 3 inner petals; and (5) reduction in the number of carpels. Indeed, the fleshy, stiff texture of mature petals of *S. viridiflorus* might lead one at first to reject its inclusion in the genus. Petals at the bud stage, however, clearly show the characteristic *Sapranthus* petal venation, and the large, green, probable mammal-dispersed fruiting monocarps are typical of section *Sapranthus*. Along with morphological and developmental changes, shifts in both floral odor (from fetid to sweet and fruity, albeit with a very slight component of the fetid odor remaining) and pollinators (from Tenebrionidae, which consume the fleshy food bodies of *S. palanga* R. E. Fries at Santa Rosa National Park in Guanacaste, Costa Rica, to Nitidulidae at the La Selva Biological Station [pers. obs.]) have accompanied the successful penetration into wetter forest.

**Paratypes.** COSTA RICA. **Alajuela:** Reserva Biológica Monteverde, Río Caño Negro y Aguas Gatas, 10°23'N, 84°47'W, 600 m, 18 Oct. 1989 (fr), *E. Bello 1385* (MO); Parque Nacional Rincón de La Vieja: Upala, 10°46'N, 85°17'W, 900 m, 29 Feb. 1988 (fl), *G. Herrera 1564* (BRIT, CR, F, MEXU, MO, NY, PMA, U, US, WIS). **Cartago:** El Zapote nature reserve, 5 km S of Turrialba, 700 m, 1 Mar. 1987 (fl, fr), *W. Burger & J. Gomez-Laurito 12040* (CR, F, MO); Florencia Sur IICA, Turrialba, 625 m, 11 May 1972 (st), *L. Poveda 84* (CR); Forêts de Turrialba, 570 m, Nov. 1893 (fr), *Tonduz 8355* (US); Forêts de las vueltas Tucurrique, 635–700 m, Jan. 1899 (fr frag.), *Tonduz 13138* (US); forest near Turrialba (IICA Experimental Plot), ca. 2500 ft., 8 July 1965 (fl), *J. W. Walker 132* (CR, F, GH, MO, U, WIS), 4 Apr. 1966 (fr), *J. W. Walker 364* (CR, DUKE, F, GH, MO, U, US, WIS); Atirro Turrialba, pocos orillas del Río Atirro, 400–500, 9 Dec. 1985 (fr), *N. Zamora 1154* (CR). **Guanacaste:** Cantón de Liberia, Parque Nacional Guanacaste, Estación Cacao, 10°55'45"N, 85°28'15"W, 1100 m, 23 Nov. 1990 (fr), *R. Espinoza 41* (INB, MO), 10°55'38"N, 85°29'11"W, 1060–1100 m, 1 June 1990 (fr), *F. Quesada 38* (CR, INB, MO, U); Parque Nacional Rincón de La Vieja, Hacienda Santa Maria, 10°48'N, 85°19'W, 800–900 m, 2 Oct. 1987 (fr), *G. Herrera & R. Robles 754* (CR, F, MEXU, MO, NY, U, US, WIS), 10°46'05"N, 85°17'40"W, 1000 m, 17 Sep. 1990 (fr), *G. Rivera 543* (INB, MO). **Heredia:** Finca La Selva (type locality), 90 m, 17 Sep. 1969 (st), *G. Frankie 400a* (MO), *400c* (F); hills to the S of the Río Sarapiquí at Chilamate de Sarapiquí, 10°27'N, 84°04'W, 60–100 m, 4 July 1985 (fr), *M. Grayum et al. 5555* (MO); La Selva Biological Station, 1 Dec. 1980 (fr), *B. Hammel 10620* (DUKE), 7 Apr. 1982 (fr), *B. Hammel 11601* (DUKE), 20 Jan. 1973 (fl), *G. Hartshorn 1096* (CR, F, MO, U), 1 Aug. 1984 (fr), *G. E. Schatz 1031* (CR, MO, WIS), 24 Sep. 1981 (fr), *D. Smith 283* (DUKE), 26 July 1979 (fr), *J. Sperry 1972* (DUKE). **Limón:** Sixaola region, headwaters of Quebrada Mata de Limón, central fork and hills between central and westernmost forks, Finca Anai, 9°35'N, 82°39'W, 25–40 m, 19 Nov. 1984 (fr), *M. Grayum 4503* (CR, MO); Cordillera de Talamanca, Canton de Matina, el camino entre Río Barbilla y lagunas, cabeceras de Río Caño Seco (Quebrada Barreal), 10°01–02'N, 83°27'W, 300–450 m,



Figure 3. Fruiting branch of *Unonopsis stevensii* G. E. Schatz (*W. D. Stevens 24716*; photo: O. M. Montiel).

16 Oct. 1988 (fr), *G. Herrera 2203* (CR, F, MO, U); 10–15 km SW of Siquirres along Río Pacuare, 10°06'N, 83°28'W, 100 m, 16 Feb. 1991 (fl, fr), *P. J. M. Maas et al. 7956* (CR, MO(3), U), *7961* (CR, MO(2), U); Paturages a la Colombiana, Llanuras de Santa Clara, 200 m, June 1899 (fl, fr), *Pittier 13404* (*Donnell Smith 7576*) (G, US(3)); Cerro Coronel, E of Laguna Danto, 10°41'N, 83°38'W, 60–100 m, 15 Mar. 1987 (st), *W. D. Stevens et al. 24881* (MO). **Puntarenas:** between guard station and Quebrada Bonita, Carara Reserve, 9°47'N, 84°36'W, ca. 40 m, 25 July 1985 (fr), *M. Grayum & R. Warner 5695* (CR, MO). **San José:** near Villa Colon, slopes of Cedral, close to Pacaca River, ca. 1000 m, 5 Apr. 1966 (fr), *L. Fournier & Salas 907* (WIS); Cantón de Mora, valle del Tárcoles, Alto Tigre, al E de Piedras Negras, 9°54'50"N, 84°17'40"W, 800 m, 14 Feb. 1994 (fr), *E. Lépiz & Q. Jiménez 170* (CR, INB, MO, U); Ciudad Colón, Z.P. El Rodeo, Bajo Morales, 9°55'01"N, 84°15'01"W, 800 m, 22 Sep. 1993 (st), *J. F. Morales et al. 1733* (CR, INB, MO, U); Cantón de Acosta, Z.P. Cerros de Escazú, Cuenca del Río Tabacia, 9°50'52"N, 84°04'40"W, 1600–1700 m, 14 May 1994 (st), *J. F. Morales 2770* (CR, INB, MO). NICARAGUA. **Río San Juan:** near Caño Chotaleno, 20 km NE of El Castillo, 200 m, 18–21 Apr. 1978 (fr), *D. Neill & P. Vincelli 3612* (MO); orillas del Río Santa Cruz, afluente del Río San Juan, 11°02'N, 84°24'W, ca. 42 m, 22 Mar. 1985 (st), *P. Moreno 25555* (MO). PANAMA. **Los Santos:** Valle Punta Blanca, W of Tonosí, 21 Apr. 1968 (fr), *L. Holdridge 6231* (MO).

***Unonopsis stevensii* G. E. Schatz, sp. nov. TYPE:**

Costa Rica. Limón: Cerro Coronel, E of Río Zapote, from E of new road to Raphia swamp, within 1 km of Río Colorado, 10°40'N, 83°40'W, 10–40 m, 12 Mar. 1987 (fl, fr), *W. D. Stevens et al. 24716* (holotype, MO; isotypes, CR, F, INB, HNMN, K, MEXU, MO, OWU, PMA, U, UNAN, US, WIS). Figure 3 and [http://hoya.mobot.org/mobot/research/image/50114934\\_001.jpg](http://hoya.mobot.org/mobot/research/image/50114934_001.jpg)

A *Unonopsis panamensi* R. E. Fries petiolis foliorum brevioribus, base laminae rotundata ad vulgo subcordata, floribus luteis minoribus, carpellis 3–7 differt.

Slender treelet to tree, 3–12 m tall, the young branches glaucous. Leaves chartaceous, the petiole 0.2–0.3(–0.4) cm long, stout, initially glaucous; lamina narrowly lanceolate to oblong to oblong-elliptic to oblanceolate, sometimes slightly falcate, 12.0–25.0 cm long, 2.0–6.3 cm broad, the base rounded to usually subcordate and slightly asymmetrical, the apex long-acuminate to caudate, the acumens to 2 cm long, the upper and lower surfaces glabrous, the venation weakly brochidodromous

with 13–16 lateral veins per side, the midrib elevated above and below. Flowers in 1–2-flowered condensed rhipidia less than 0.4 cm long, axillary in the foliate zone, ramiflorous just below the foliate zone, or occasionally cauliflorous on the main trunk, the pedicel 0.7–1.2 cm long, ferruginous puberulent, bearing a minute basal bract; sepals triangular, 0.2 cm long, 0.2 cm broad, ferruginous puberulent; petals 6, in two subequal valvate whorls, pale to bright yellow, broadly ovate, 0.4–0.5 cm long, 0.3–0.4 cm broad, concave, the apex acute to obtuse, the outer petals ferruginous puberulent-sericeous outside, the inner petals glabrous outside except puberulent-sericeous along the triangular keel corresponding to the area not covered by the overlapping outer petals; stamens ca. 30, 1.0–1.1 mm long, the apical prolongation of the anther connective truncate discoid; carpels 3–7, the ovary 1.3–1.4 mm long, ferruginous sericeous; ovules (1–)2. Fruit a cluster of stipitate, usually 1-seeded monocarps, the pedicel elongating to 1.8 cm long, the monocarps globose to short cylindrical, 1.2–1.8 cm diam., orange-red, glaucous, the stipe slender, 0.9–1.4 cm long, to 0.1 cm diam.; seeds flattened globose, 1.0 cm diam., 0.5 cm thick, light reddish brown, foveolate, with an equatorial ridge.

*Distribution.* *Unonopsis stevensii* is thus far known only from wet evergreen forest in northeastern Costa Rica in the region of Barra del Colorado

and Cerro Coronel near the mouth of the Río Colorado.

*Unonopsis stevensii* appears to be most closely related to *U. panamensis* R. E. Fries, which is known from the former Canal Zone in Panama to the Pacific side of Costa Rica from the Osa Peninsula to east of Quepos. The two species share narrowly lanceolate to oblong-elliptic to oblanceolate leaves that are often somewhat falcate, and small flowers with usually more than one ovule, often borne on older wood (cauliflory). However, the petiole in *U. stevensii* is distinctly shorter (0.2–0.3 vs. 0.4–0.7 cm), the leaves often approaching sessile, and the leaf base is distinctly rounded to subcordate vs. acute in *U. panamensis*. In addition, flowers of *U. stevensii* are smaller than those of *U. panamensis* (0.4–0.5 vs. 0.7 cm long), are yellow vs. cream, and have fewer carpels (3–7 vs. 10–20). The species epithet honors W. D. Stevens, who first collected the species, and who has spearheaded the *Flora de Nicaragua* project.

*Paratypes.* COSTA RICA. **Limón:** Cerro Coronel, E of Laguna Danto, 10°41'N, 83°38'W, 20–170 m, 16–23 Jan. 1986 (fr), *W. D. Stevens* 23647 (CR, MO), 15–20 Sep. 1986 (fl, fr), *W. D. Stevens* 24514 (CR, MO, U), 14 Mar. 1987 (fl, fr), *W. D. Stevens et al.* 24832 (MO), E of Río Zapote along and above new road within 1 km of Río Colorado, 10°41'N, 83°38'W, 10–40 m, 13–14 Sep. 1986 (fl), *W. D. Stevens* 24245 (CR, MO), 13–14 Sep. 1986 (fr), *W. D. Stevens* 24282 (CR, MO, U); Refugio Nacional Barra del Colorado, fields and pastures between Río Cirripocito and Río Sardina, 10°38'N, 83°45'W, 12 m, 22 Apr. 1990 (fl, fr), *M. Grayum* 9822 (CR, MO, U).